Dewberry®

FEMA Supply Chain Analysis: Monitoring the Transportation of Goods during a Pandemic

VASITE Annual Meeting and Technical Conference

Session 3C – Technology

June 16, 2022

Presenter

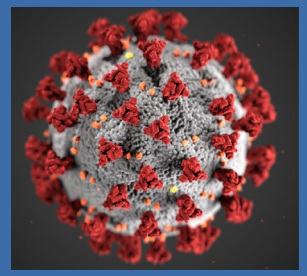
Gerard (Jerry) Mrykalo, PE, PTOE

- Dewberry (Fairfax, VA)
  - 17 years of experience
  - Professional Engineer and Professional Traffic Operations Engineer
  - Manages mid-Atlantic traffic engineering group
  - 15+ traffic engineers and planners in Mid-Atlantic
- Experience:
  - Planning, analysis, traffic control device design
  - Work zone traffic control (TTC)
  - ITS and Electronic Toll Collection design
  - Design Build
  - I-64 Capacity Improvement (Segments I and III)
  - I-95 / Route 630 DDI
  - I-81 Widening MM 136.6 to 141.8
  - Dulles Corridor Metrorail Project
- Performed traffic analysis and assessments for 5 FEMA disasters

Agenda

- 1. Challenge
- 2. FEMA (and SCAN)
- 3. Analysis and Monitoring Process
- 4. Notable Findings
- 5. Lessons Learned

1. Challenge



- By early March 2020, nationwide COVID-19 infections were nearing 2,000 and deaths nearing 50
- Closures were beginning to be implemented and panic buying was emptying grocery stores
- Regional quarantines were in place and being threatened elsewhere, impacting transportation networks and restricting or deterring truck hauling of critical commodities into / out of “hot spots”
  - What would be the impact of these “non-paramedical interventions” on the transportation network and the supply chain?
  - Was there risk of supply chain failure?
  - Would the highway network remain reliable for the delivery of critical commodities (food, water, PPE)?

2. FEMA & SCAN

On March 13, 2020 the President declared a National Emergency, activating FEMA & SCAN

Federal Emergency Management Agency (FEMA) Logistics Management Directorate

The Supply Chain Analysis Network (SCAN) is a partnership of subject matter experts, researchers and analysts working for CNA, the American Logistics Aid Network, the MIT Center for Transportation and Logistics, Dewberry, and independent subject matter experts. SCAN supports FEMA's Logistics Management Directorate on an on-call basis during disaster activations. SCAN mission is to use data and analysis to highlight key supply chain features, structure, conditions, and relationships relevant to decision making during disaster response.

2. FEMA & SCAN

Traffic and Highway Assessment Team

Ports and Intermodal Assessment Team

Lifeline Team (food, fuel, water, etc.)

Ecosystem Team (macro level commodity movement)

Project Management Team

3. Analysis and Monitoring Process

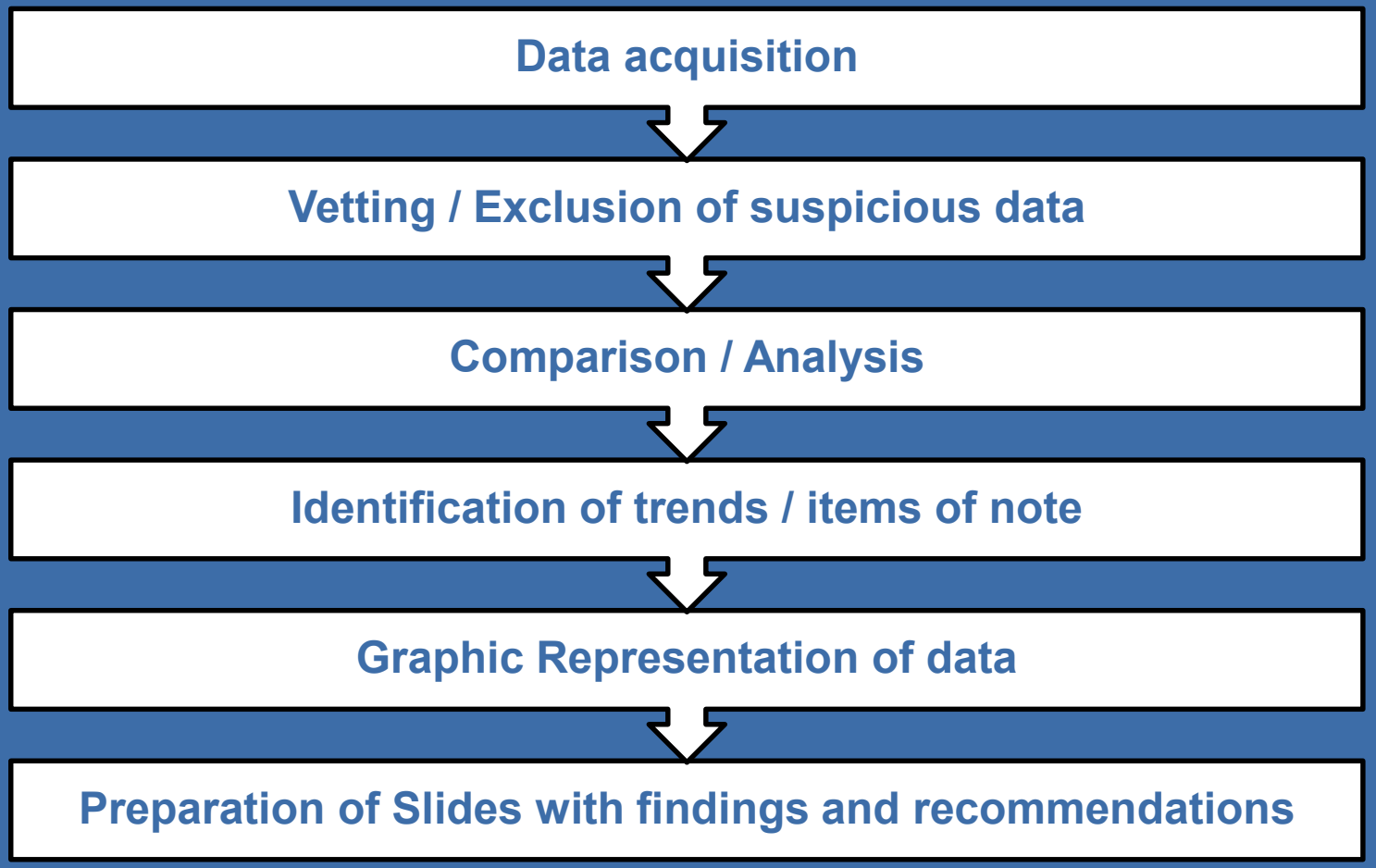
- Dewberry performed traffic data collection analysis, assessment, monitoring, and developed recommendation for regional and national emergency managers from March thru June 2020
- Performed analysis and met with FEMA 7-days a week for entire duration of mission, with team of 3 traffic engineers
- Focused on the status of freight (truck) traffic carrying critical commodities, both regionally and nationally
- Tracked volume trends to measure the health of the supply chain
- Assessed status of highway support services such as fuel and truck stops

How did we gather and analyze real-time data on a national scale?

3. Analysis and Monitoring Process

- Gathered traffic data from 20+ transportation agencies:
  - Leveraged existing relationships, or performed cold calls
  - Direct data
    - Automated count stations
      - Direct access
      - Daily / regular reports
      - Class breakdowns
  - Open Source big data
    - CCTV camera technology
    - Travel speeds & congestion
    - Freightwaves SONAR
    - USDOT BTS

3. Analysis and Monitoring Process

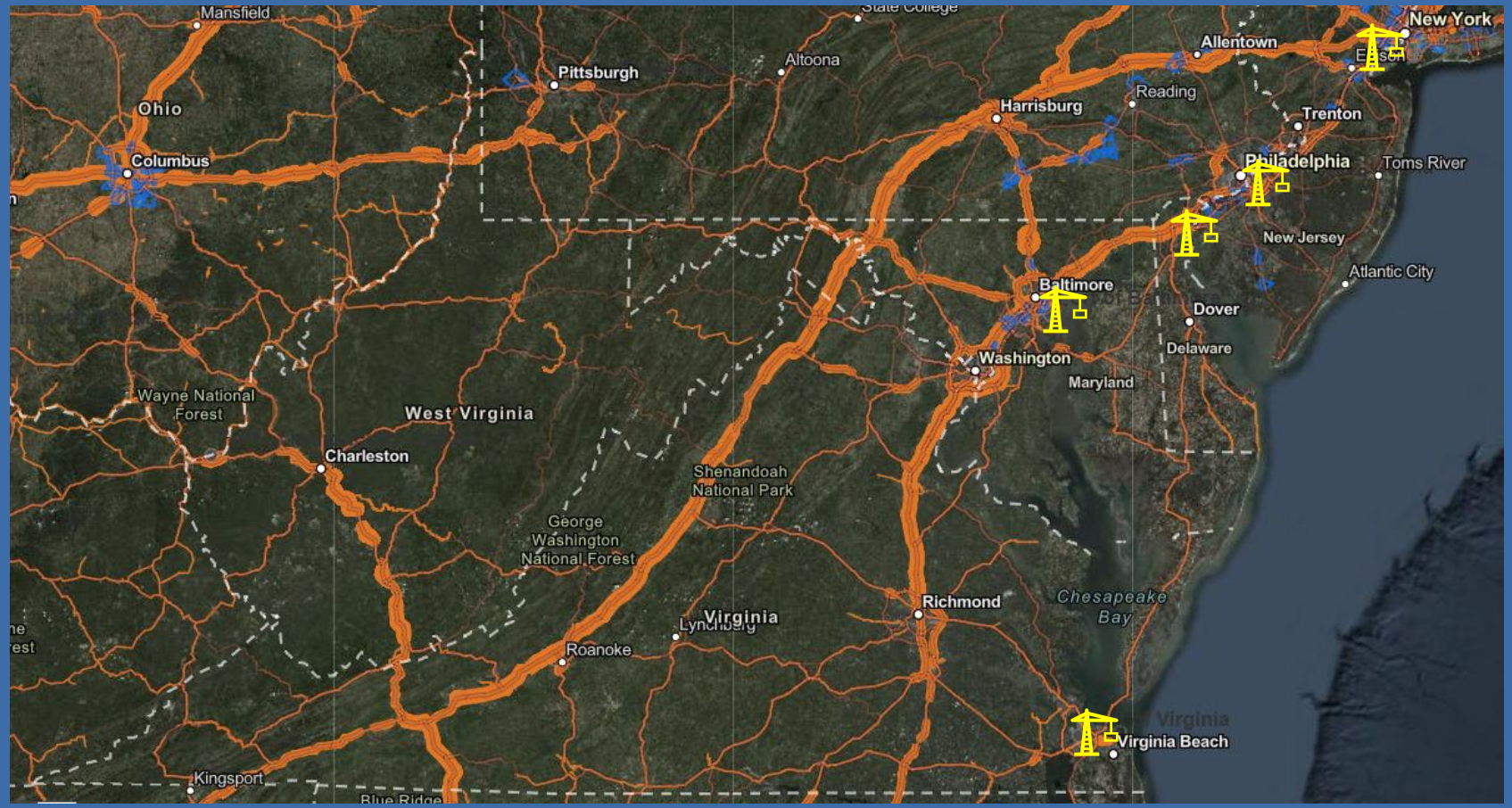


3. Analysis and Monitoring Process

- Produced 22 Regional and National *Traffic and Freight Trucking Assessments*
- US Overall
- NY-NJ-S.E.PA
- Chicago
- New Orleans
- Pacific N.W.
- California

3. Analysis and Monitoring Process

- Leveraged big data and GIS analysis to assist in selection of focus areas
  - “Blue Sky” Freight volumes
  - Freight activity concentration areas



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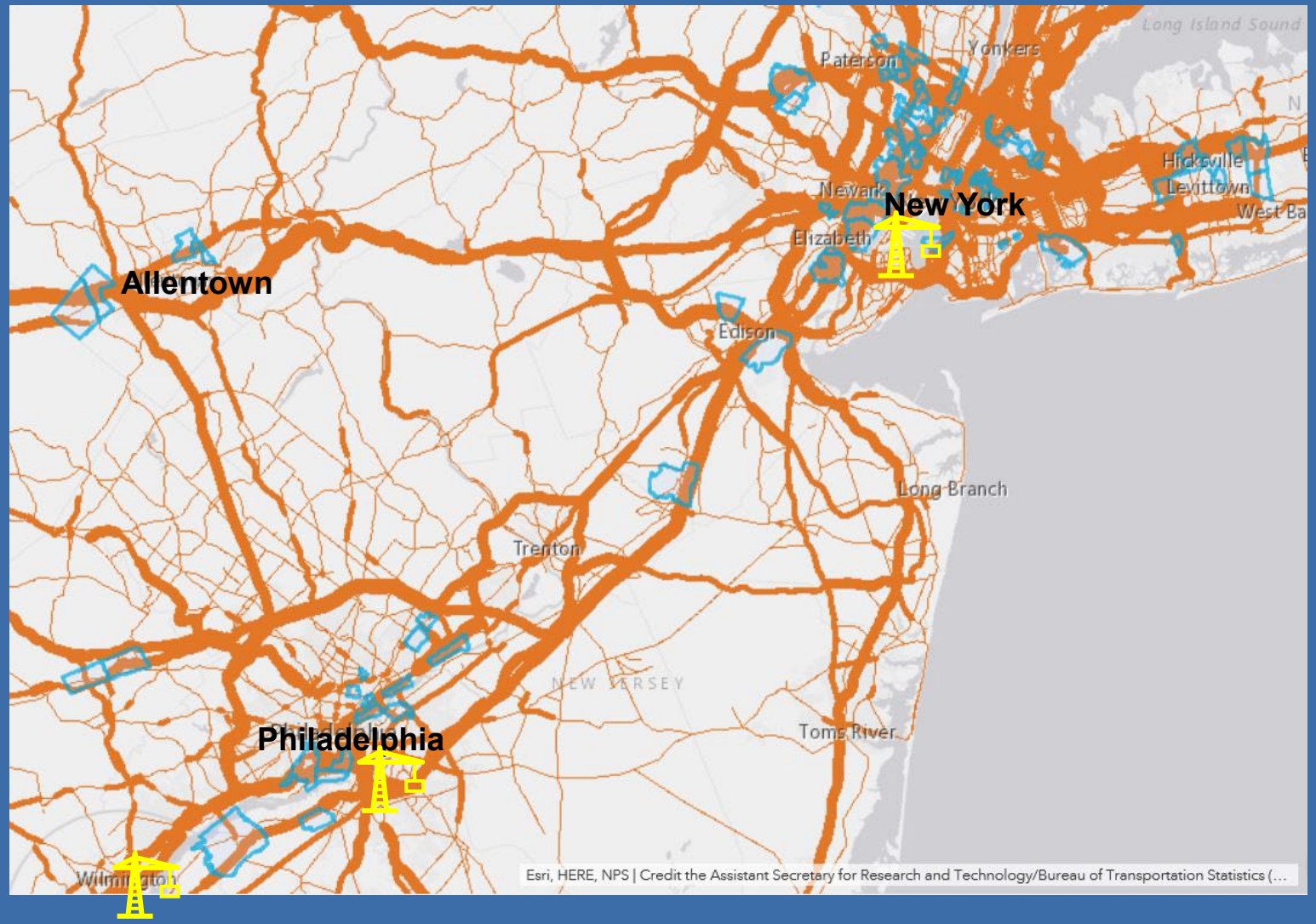
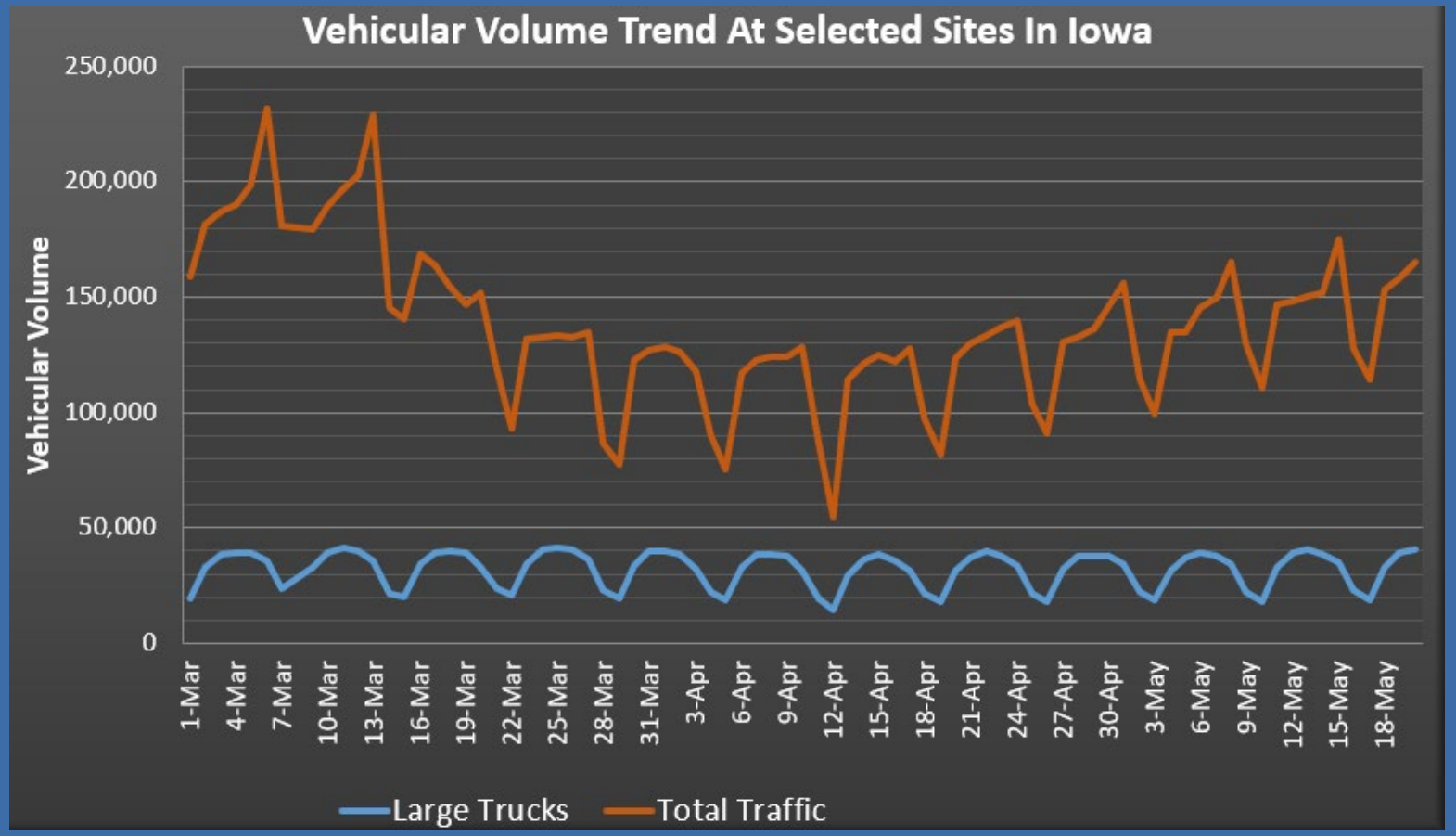


4. Notable Findings

- The national highway system generally operated efficiently throughout the height of the COVID-19 restrictions
  - Benefitted from a drop in passenger car volume
  - Impacted by checkpoints and expanded construction lane closures
- Truck services (fuel, truck stops) generally remained accessible
  - Private operators largely remained open, closing in-person dining
  - Closure of rest areas (example: PA) impacted truck operations
- Reassurance of the continuity of the highway network and private supply chain allowed FEMA to concentrate on other priorities, such as PPE distribution

4. Notable Findings

- Truck traffic remained generally stable as compared to passenger cars



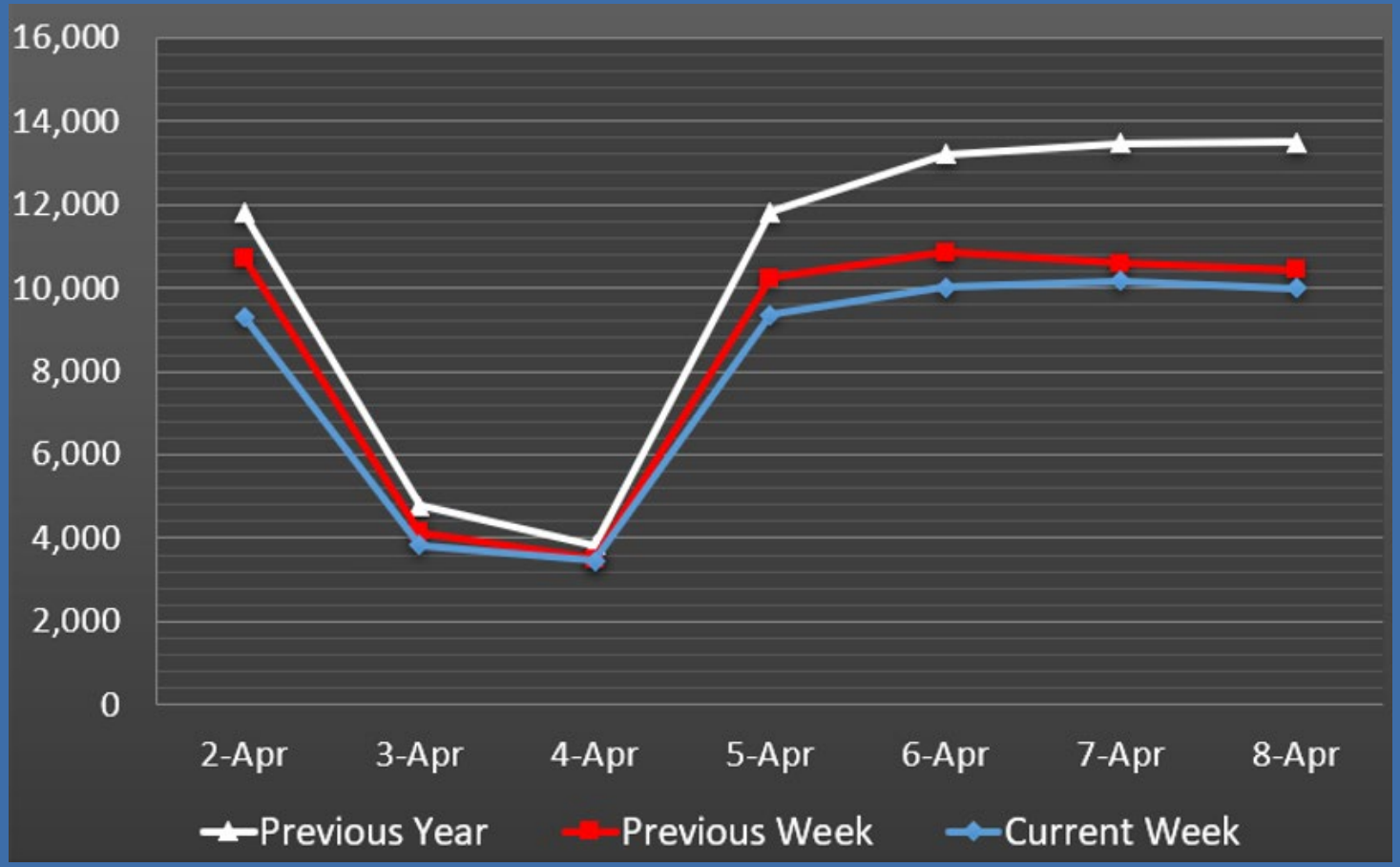
4. Notable Findings

- Different regions exhibited vastly different freight traffic trends

State/Location	Weekly Trends							
	3/30 to 4/3	4/6 to 4/10	4/13 to 4/17	4/20 to 4/24	4/27 to 5/1	5/4 to 5/8	5/11 to 5/15	5/18 to 5/22
Indiana (Selected sites)	↓	↓	↓	→	→	→	→	↑
Georgia (Selected sites near Atlanta)	→	↓	↑	→	↑	↑	↑	↑
Iowa (Selected sites)	↓	↓	→	↑	→	→	↑	→
Washington (Selected sites)	↓	→	→	↑	→	↑	↑	→
New York (Selected sites)	↓	↓	↑	↑	↑	↑	↑	↑
The Port Authority of NY & NJ	↓	↓	→	↑	↑	↑	→	↑

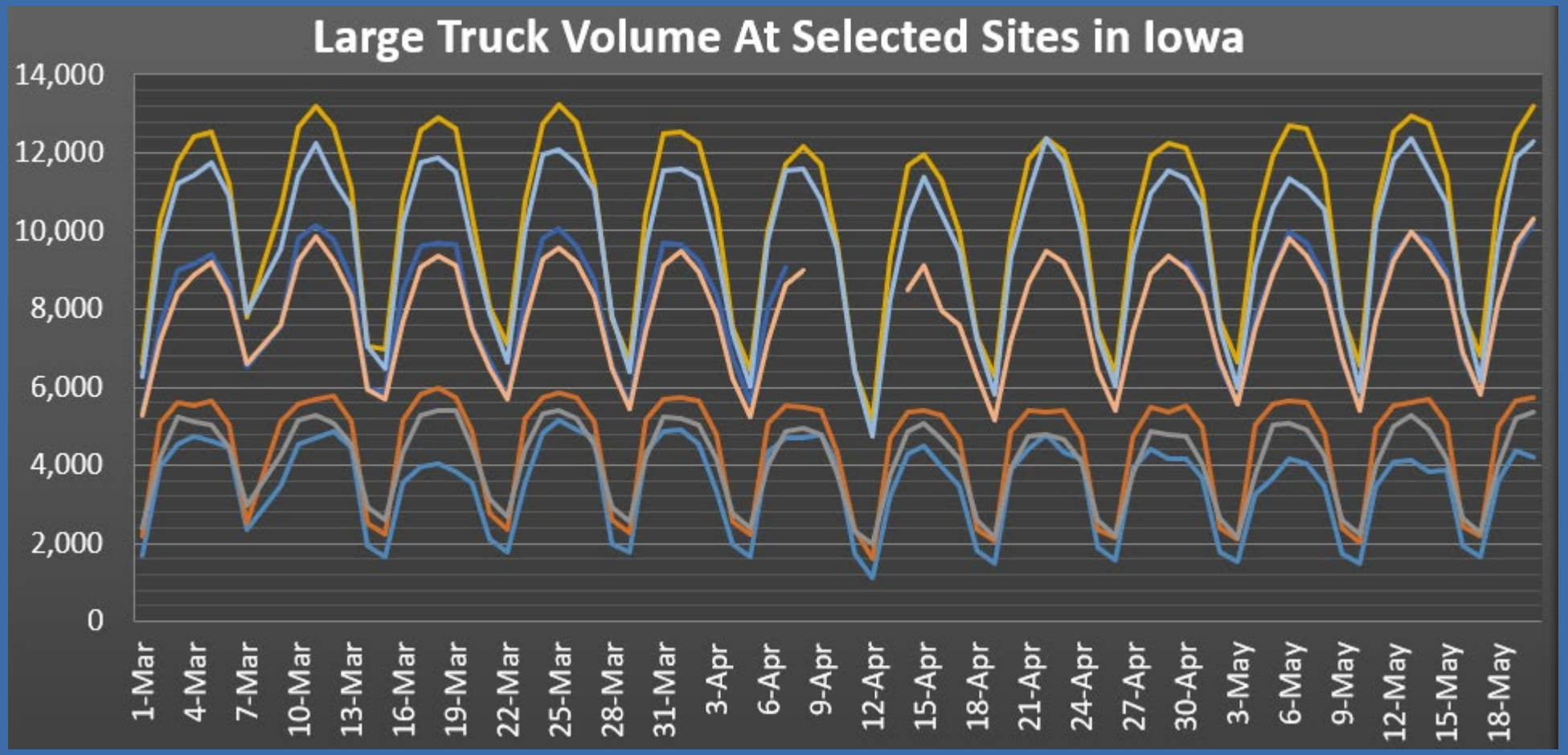
4. Notable Findings

- Metro areas had significant reductions in truck traffic



4. Notable Findings

- Long-haul truck traffic remained robust



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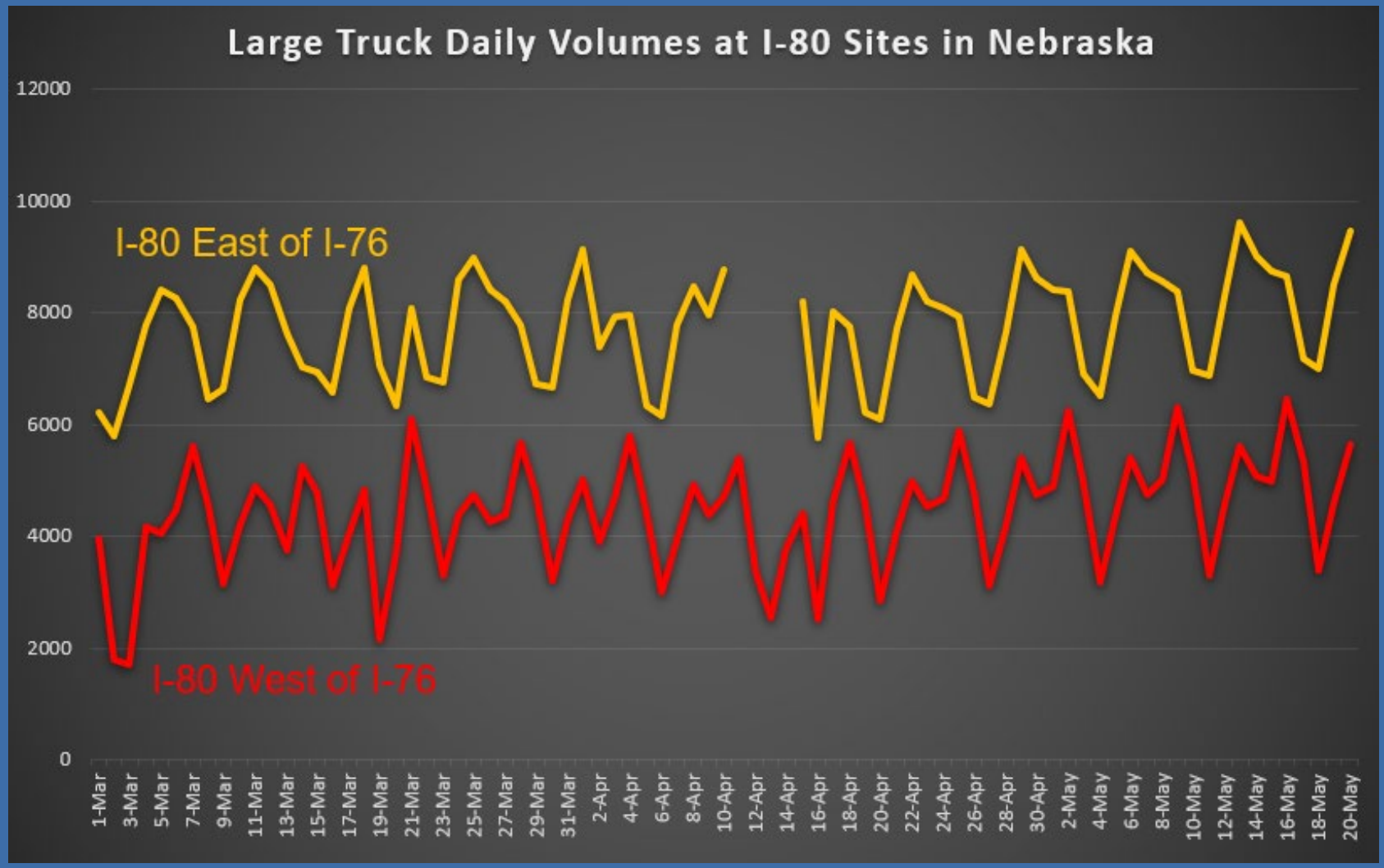
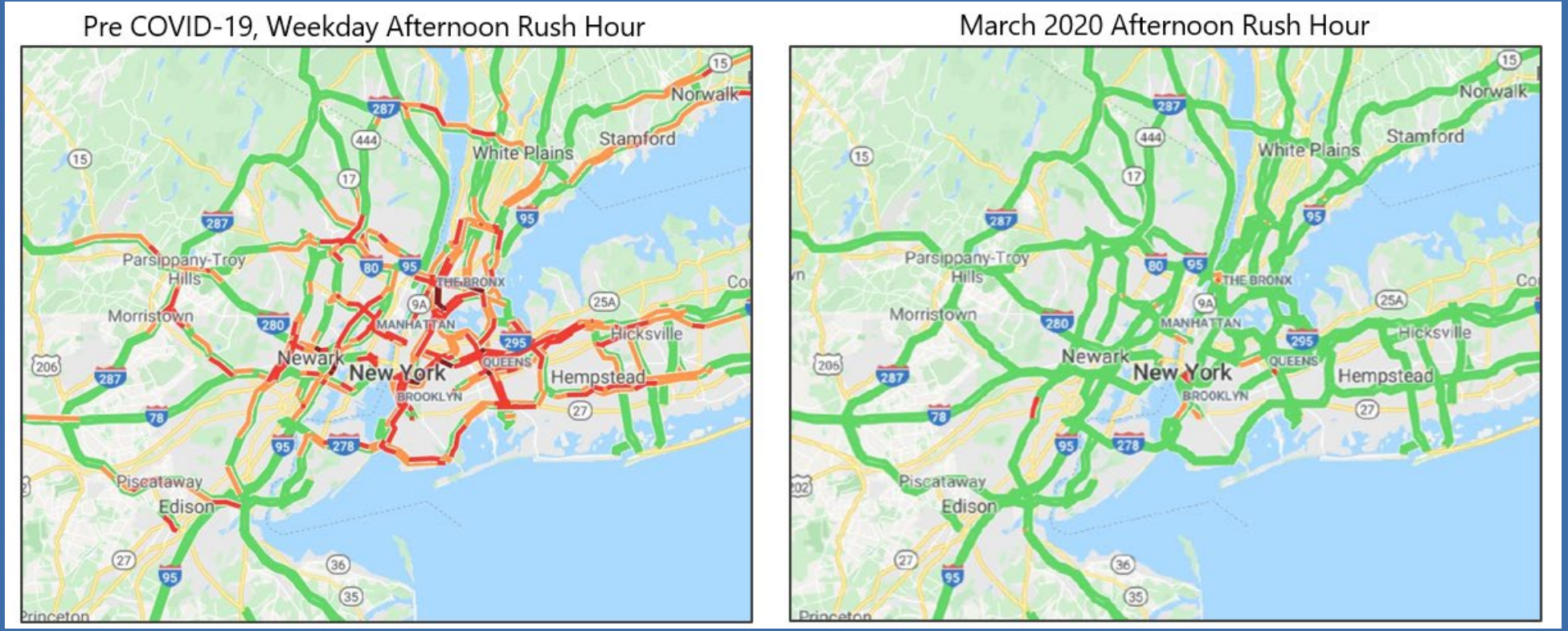


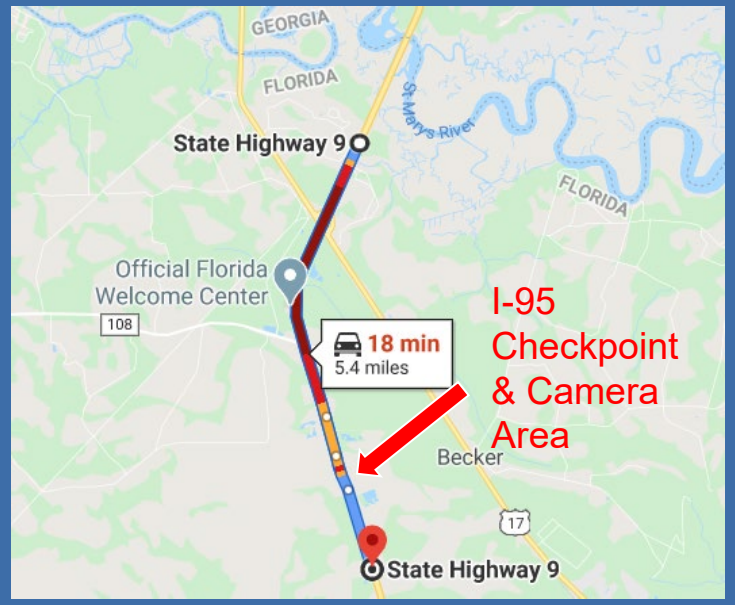
4. Notable Findings

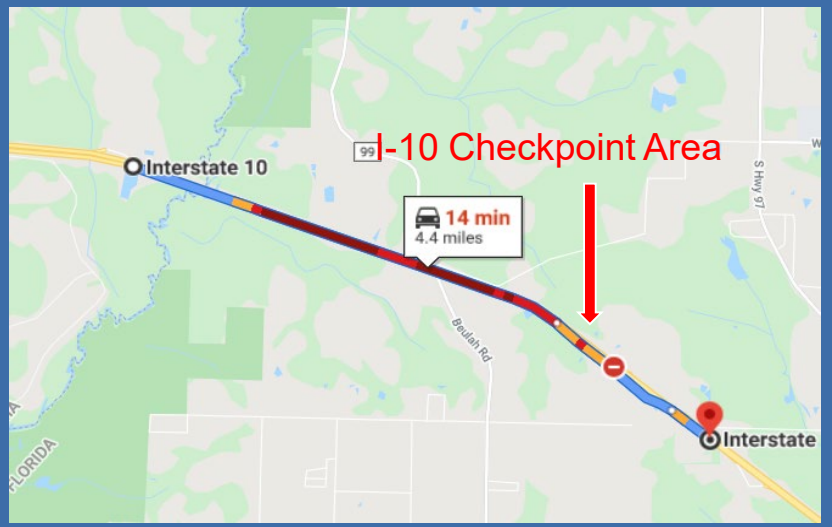
- Rush hour congestion dissipated, providing unimpeded freight flow into and out of metro areas



4. Notable Findings

- Interstate checkpoints had significant impact on highway network
  - Impacted freight flow
  - Effective public health measure?

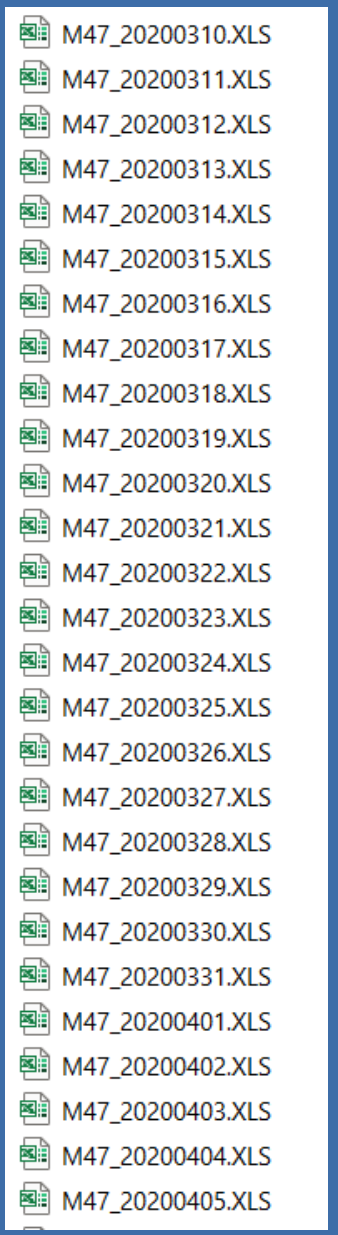




5. Lessons Learned

1. Need for real-time data was critical (week old data was too old)

   - Necessitates a different approach to data collection
   - Establish and maintain relationships and data feeds with transportation agencies
   - Data vetting process is critical



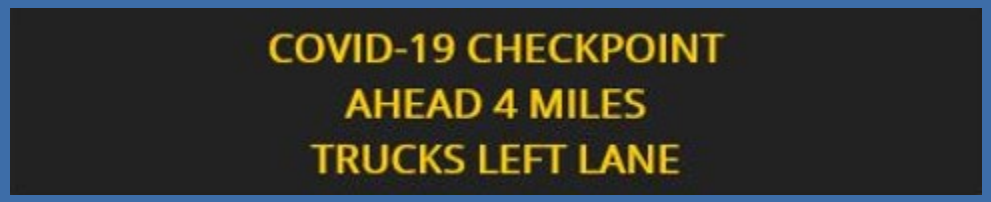
5. Lessons Learned

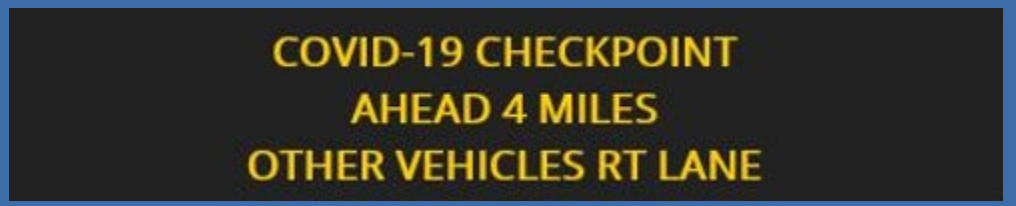
2. Class data is critical, including separating small trucks from large trucks

5. Lessons Learned

3. Screening checkpoints have a high impact on traffic, and when implemented, trucks should be allowed to bypass
   - Remove checkpoints once a queue threshold is reached
   - Communicate that truckers are not subject to quarantine

Overhead Dynamic Message Signs:





   - Recommendations against implementation of freeway checkpoints was passed along to state and national leaders

5. Lessons Learned

4. Transportation Engineering and Analysis can become critical need when faced with new disasters, and be of interest to those at the highest levels of government.

   - Quality control is critical, even in a hyper-fast environment.

   - This mission built a solid foundation for how to predict and mitigate impacts to the nationwide transportation network and supply chain for COVID-19 resurgence or similar future disasters.

THANK YOU